Local employment policies in the context of the economic crisis:Influences of the European Community structural instruments

Lucica Matei and Ani Matei

National School of Political Studies and Public Administration (NSPSPA)

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Prof. Dr. Lucica Matei[*]

Prof. Dr. Ani Matei[**]

The new context of the employment policies in Europe

Europe is facing an economic and financial crisis that affects the citizens and the European economic activity. The crisis effects are registered on the level of population and labour market, local economies, quality of life, local governance and economic and social increasing disparities. In general, the crisis generates a decrease of the economic activities and an unemployment increase (table 1).

The end of year 2008 is marked by the reduction of the main social-economic indicators (the Gross Domestic Product GDP growth rate, the employment growth rate, the investment flows growth rate), by significant transformations of the labour market with regard to the decrease of active population and employment, creation of new jobs. This crisis affects the "real economy" of jobs.

At the middle of the 90's on the European labour market there have been identified problems, like the one presently occurring due to the economic and financial crisis, namely the unemployment, a problem that has been approached in the European Employment Strategy (EES) initiated through the "Luxembourg Process" (1997) – a meeting exclusively dedicated to employment. During that same period, namely the second half of the 90's, the Treaty of Amsterdam (1997) introduces provisions referring to the employment policy and social protection, and the assemblies on the employment policies topic from Cardiff (1998 – the Cardiff process – the economic and internal market reform), Koln (1999), Lisbon and Stockholm (2000 and 2005), Barcelona (2002), consecrate the principle of collaboration between EU Member States in the field of employment policy and its accordance with the economic policies, thus creating a direct link between employment and the economy.

In December 2008, the European Council approves the "European Plan to Re-launch the Economy", aiming at supporting the actions that can combat the crisis in the European Union's states. The cohesion policy's instruments of EU-EFRD, ESF, CF, represent one third (1/3) of the total EU budget and are the biggest source of investment in the EU real economy.

The issue of employment approached on a regional level confers realistic arguments in developing the strategies by taking into account the local features.

[*] Prof.Dr. Lucica Matei, Faculty of Public Administration, National School of Political Studies and Public Administration, Bucharest, Romania

[**] Prof.Dr. Ani Matei, Faculty of Public Administration, National School of Political Studies and Public Administration, Bucharest, Romania

The European Social Fund is the main financial instrument for structural actions, financing Member States' actions comprised in the National Action Plans for Employment that aim at preventing and combating unemployment, human resource development and labour market integration, equality of chances between men and women, sustainable development and economic and social cohesion.
The employment policies of the EU Member States must facilitate the participation to employment of all persons able to work, being related to other economic policies, of regional development, covering the EES objectives:

a) Full employment;
b) Improving quality and labour productivity;
c) Consolidating social and territorial cohesion.

The EU Member States, in the framework of the National Reform Programs (NRP) design the employment policies in accordance with the "Integrated Guidelines for Growth and Jobs" (COM(2009)34).

*Table 1**. The evolution of the unemployment rate in certain states** (Percentage of labour force)*

	2007	2008	2009
European Union	7.1	7.0	8.9
Australia	4.4	4.2	5.6
Austria	4.4	3.8	4.8
Belgium	7.5	7.0	7.9
Canada	6.0	6.1	8.3
Czech Republic	5.3	4.4	6.7
Denmark	3.8	3.3	6.0
Finland	6.9	6.4	8.2
France	8.4	7.8	9.5
Germany	8.4	7.3	7.5
Greece	8.3	7.7	9.5
Hungary	7.4	7.8	10.0
Iceland	2.3	3.0	7.2
Ireland	4.6	6.4	11.9
Italy	6.2	6.8	7.7
Japan	3.9	4.0	5.1
Korea	3.2	3.2	3.6
Luxembourg	4.2	4.9	5.4
Mexico	3.7	4.0	5.5
Netherlands	3.2	2.8	3.4
New Zealand	3.7	4.2	6.1
Norway	2.5	2.5	3.1

Poland	9.6	7.2	8.2
Portugal	8.1	7.8	9.6
Slovak Republic	11.2	9.5	12.0
Spain	8.3	11.4	18.0
Sweden	6.1	6.2	8.3
Switzerland	3.6	3.5	4.4
Turkey	8.8	9.7	12.6
United Kingdom	5.3	5.6	7.6
United States	4.6	5.8	9.3

Source: OECD Harmonised Unemployment Rates News Release, February 2010

The community (EU) dimension of the employment policies, education and training must be used in a creative manner by the Member States for developing the strategies of acquiring new competences, improving the jobs' quality and providing support to those who lost their jobs.

The European Structural Instruments

EU acts through these financial instruments in order to eliminate the economic and social disparities between regions, aiming at reaching an economic and social cohesion, economic growth, competitiveness, employment.
The European Social Fund (ESF), the main instrument of EU for investments in the human resources, is one of the structural funds that aim at reaching the strategic objectives of the EU employment policy. During 2007 – 2013, ESF will invest almost 76 billions of Euros in the Member States (table 2) for projects on employment support and increasing the level of education and competences.
ESF encourages change and adaptation to change and supports Europe's economic recovery.
The European Regional Development Fund (ERDF) is one of the structural funds. Its main objective is promoting the economic and social cohesion inside EU through reducing the imbalances between regions or social groups. The Cohesion Fund (CF) is a structural instrument that helps the EU Member States to reduce the economic and social discrepancies and to reach a stability of their economies as far back as 1994.

Table 2. ***Planned Cohesion Policy interventions 2007 – 2013 by Member State in Millions Euro 2004 prices***

Country	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*Total*
Poland	7680.0	8024.9	8365.9	8405.0	8747.9	9073.7	9401.1	**59698.6**
Czech	3136.0	3222.9	3305.9	3391.2	3472.0	3547.7	3621.6	**23697.2**
Cyprus	158.2	128.9	99.7	70.4	41.2	41.2	41.2	**580.8**
Estonia	355.7	379.7	405.4	432.8	462.6	494.4	527.5	**3058.1**
Greece	2914.8	2803.8	2692.9	2582.0	2471.2	2407.9	2344.6	**18217.2**
Spain	5947.0	5329.7	4712.8	4196.2	3879.6	3783.5	3687.4	**31536.3**
Ireland	199.9	167.4	134.9	102.4	69.9	70.0	70.1	**814.5**
Italy	2774.0	28690	2753.0	2744.0	2690.0	2724.0	2714.0	**19268.0**
Latvia	480.0	513.0	549.0	584.0	619.0	655.0	691.0	**4091.0**
Lithuania	725.3	771.5	819.6	867.8	918.3	971.5	1023.0	**6097.0**
Hungary	2868.0	2990.9	3121.4	3227.4	3302.7	3414.4	3526.6	**22451.5**
Malta	108.1	108.5	108.8	109.1	109.2	108.8	108.3	**760.8**
Portugal	2807.2	2783.1	2759.2	2735.3	2711.4	2687.4	2663.4	**19146.9**
Slovenia	523.9	527.3	530.7	534.1	537.5	540.9	544.3	**3738.7**
Slovakia	1227.9	1303.3	1385.7	1479.7	1558.0	1631.5	1678.2	**10264.3**
East Germany	2310.0	2264.0	2234.0	2196.0	2157.0	2118.0	2079.0	**15358.0**
Bulgaria	486.0	682.9	900.6	929.4	974.0	1016.9	1057.5	**6047.3**
Romania	1261.2	1774.2	2339.3	2752.5	2906.6	3063.4	3219.4	**17316.6**
Total	**35963.2**	**36645.1**	**37218.5**	**37339.5**	**37628.1**	**38350.3**	**38998.2**	**262142.9**

Source: DG Regional Policy (2007), in Bradley,J., Untiedt,G., Mitze,T. 2007, p.12, Table 2.2.

The main objective of the EU cohesion policies is promoting the economic growth and job creation in accordance with the Lisbon Strategy (the percentage increase to 70%).
The key feature of the cohesion policy is that it is based on an efficient programming system, which establishes the way the funds shall be spent on a seven years period.
On a national level, that of the EU Member States, the use of the cohesion policy's funds influences the national or regional development paths, the programming process thus becoming an important mechanism for planning the development on a 2007 – 2013 period.
The European Regional Development Fund (ERDF), the European Social Fund (ESF), and the Cohesion Fund (CF) contribute to reaching three objectives (table 3):

1. "Convergence" supports the economic growth and employment in 84 regions from 17 states of the European Union (EU 27), with 154 millions inhabitants where the value of the Gross Domestic Product (GDP) per capita is under 75% of the community average. This objective can be found in all the three European funds, having different values of financial contribution. Through "phasing-out" another 16 regions with a population of 16.4 millions inhabitants and with a GDP per capita slightly above the 75% limit. FC applies for the 15 Member States.

2. "Regional competitiveness and employment" consolidates the regions' competitiveness and attractiveness, the employment capacity, through a *dual approach* that assumes, on one hand, development programs for supporting the regions in anticipating and being favourable to economic changes by stimulating innovation, knowledge society, entrepreneurship and environmental protection, and, on the other hand, the increase of the number and quality of jobs by adapting the labour force and making investments in human resources. This objective is found in 138 regions from EU 27, with 314 millions inhabitants (states which are not eligible for objective 1). This objective is financed by ERDF and ESF.

3. "European territorial cooperation" is designed on three axes: cross-frontier cooperation, trans-national and inter-regional.

The European structural funds have an impact upon the development of the infrastructure, human resource or directly for economic actions, depending on the absorption capacity.
The programming of the structural and cohesion funds on a national level (Romania) is done through the National Strategic Reference Framework (NSRF) 2007 – 2013 and the Operational Programs.
The Convergence objective is accomplished in Romania through seven Operational Programs applicable to the 8 Romanian development regions, established by the Law no. 315/2004 on regional development, abiding the EC Regulation no. 1059/2003 referring to establishing a common system for statistical classification of the territorial units (Matei, 2004).

Table 3. Objectives and priorities of Community Structural Instruments

Convergence	Regional competitiveness and employment	European territorial cooperation	Objective / Instrument	Priorities											
				Lisbon Strategy	Infrastructure	Investments	R&D	Small and Medium Enterprises	Training	Employment	Institutional capacity and administrative efficiency	Environment and transport infrastructure	Abroad Transport	Urban Transport	Energy
√	√	√	ERDF	√	√	√	√	√							
√	√		ESF	√					√	√	√				
√			CF									√	√	√	√
			85%												
75 – 85%	50 – 85%	75 – 85%	Financing coefficient												

The distribution of funds on development regions in Romania was differentiated in terms of their degree of development, using a "development index", which reflects the economic and social disparities of the region, and using the GDP per capita, adjusted by a population density coefficient (table 4).

The cumulative multiplier of employment

The labour market plays a very important part in transmitting the policies' mechanisms. Recognised as the ensemble of the governmental measures of intervention on the labour market, aiming at creating new jobs, improving the human resource adaptation to the economic needs and ensuring the fluidity and flexibility of the labour force in order to reduce the imbalances and malfunctions, the employment policy become the topic of many scenarios, of modelling. These take into consideration the wage policies, regulations on the labour market, indicators like employment, labour participation rate and constraints on the labour market.

The local employment policy goes through changes determined by the effects of the economic and financial crisis upon the national and local economies, upon the governmental allowances on the local level for supporting the economic and social development, upon the investments, the change of the production conditions, etc. the labour force migrates from the less developed regions towards those under a sustainable development and jobs' creation, inside the same region from one community to another, from one county to another, from the urban environment towards the rural one, or the other way around, from one economic sector to another. There are registered unemployment increase (table 5), professions' lost for certain categories of population with high qualifications (determined by the lack of jobs or disappearance of some economic activities represented on local, county or regional level). At the same time, we are witnessing an increase of the local authorities' responsibilities, of the social and economic actors with regard to the development of the local community, from the point of view of accessing the development and cohesion structural funds, the European funds for economic growth, infrastructural development, environmental protection, professional conversion, human resource investment growth, new jobs' creation, etc.

Our theoretical argument begins from the premises of the general equilibrium theory, where we identify the following local features: the demand "D" and supply "Y" and the relation (1):

$$Y = D \tag{1}$$

The demand D is represented by the demand for goods and services on a local level C and by the demand for investment goods λ.

The supply Y is intended for the consumption of goods and services C and the savings E.

$$D = C + \lambda \tag{2}$$

$$Y = C + E \tag{3}$$

By applying the general equilibrium theory and replacing relation (1), D and Y with relations (2) and (3), we obtain:

$$C + E = C + \lambda \quad (4)$$

$$E = \lambda \quad (5)$$

We point out that relation (5) is valid only in an optimum situation, where the demand for goods and services is equal to the supply.
The local supply (Y) also includes the imports of goods and services (C'), and the demand (D) the exports of goods and services (C''). The equilibrium conditions become:

$$Y + C' = D + C'' \quad (6)$$

$$C + E + C' = C + \lambda + C'' \quad (7)$$

$$E + C' = \lambda + C'' \quad (8)$$

$$E - \lambda = C'' = C' \quad (9)$$

Relation (9) represents the condition of local economic equilibrium, where we locate the role of the community structural instruments with regards to the degree of employment and local income.

During 2007 – 2013, Romania benefits of financial assistance non-reimbursable from EU through the following structural instruments: European Social Fund (ESF), European Regional Development Fund (ERDF) and Cohesion Fund (CF).

The differentiated repartition of the funds on the development regions of Romania (table 6) aimed at supporting the Regional Operational Program (POR) with regard to assisting a well-balanced development of all Romanian regions, ensuring that all the areas have a minimum level of business, social and human resource infrastructure, which allows the economic growth, by using the Gross Domestic Product per capita (GDP) economic indicator in order to measure the development degree of the regions (table 4). The regions with a low level of GDP per capita will benefit of a greater share of the total funds of the POR program (for example, the Eastern Region with a 16.32% allocation), while the share of the financial allocation will be smaller for the regions with a higher GDP per capita (for example, Bucharest-Ilfov Region with an allocation of 8.86% - table 6).

Table 4. ***Feature Dimensions of the development regions in Romania***

Regions	Area (Km^2)	GDP		Population		
		millions lei current prices 2007	Per inhabitant	Inhabitants July 1. 2008	Urban %	Rural %
MACROREGION 1	68 259	100140.8	19090	5245573	56.3	43.7
NW North-West Region	34 159	50724.1	18610.5	2722063	53.3	46.7
CR Centre Region	34 100	49416.7	19579.5	2523510	59.4	40.6
MACROREGION 2	72.612	90263.1	13804	6538667	48.3	51.7
NE North-East Region	36 850	45990.1	12340.9	3719102	43.2	56.8
SE North-East	35 762	44273.0	15641.8	2819565	55.1	44.9
MACROREGION 3	36 274	147811.7	26717	5532551	62.0	38.0
BIF Bucharest – Ilfov Region	18 21	95798.2	43037.3	2248026	92.2	7.8
SM South – Muntenia Region	34 453	52013.5	15757.8	3284525	41.4	58.6
MACROREGION 4	61 246	77415.6	18486	4187651	54.7	45.3
SWOltenia South – West Oltenia	29 212	34419.6	15097.3	2262274	47.5	52.5
WR West region	32 034	42995.7	22341.9	1925377	63.1	36.9
Romania	238 391	416006.8	19315.4	21504442	55.0	44.0

Source: Romanian Statistical Yearbook 2009, p. 86

Table 5. ***The Evolution of the Indicators on the Labour Market in the Development Regions from Romania during 2007-2008***

Macroregion development region	Economically active population (thou persons)			Employment (thou person)			ILO Umemplayed (thou persons)			Activity rale %			Employment rate %			ILO unemploy rate %		
	2007	2008		2007	2008		2007	2008		2007	2008		2007	2008		2007	2008	
MACROREGION 1	2298	2295		2153	2155		145	140		60	60,3		56,1	56,5		6,3	6,1	
NW1	1198	1172		1147	1128		51	44		59,6	58,7		57,0	56,4		4,3	3,8	
Center	1100	1123		1006	1027		94	96		60,4	61,9		55,1	56,6		8,5	8,5	
MACROREGION 2	3047	2999		2851	2830		196	169		62,7	61,9		58,4	58,2		6,5	5,6	
NE	1785	1753		1696	1674		89	79		64,8	63,6		61,3	60,5		5,0	4,5	
SE	1262	1246		1155	1156		107	90		60,1	59,8		54,7	55,3		8,5	7,2	
MACROREGION 3	2661	2661		2486	2517		175	144		65,8	65,7		61,3	62,0		6,6	5,4	
S Muntenia	1600	1593		1468	1485		132	108		66,3	65,9		60,5	61,1		8,2	6,8	
B If	1061	1068		1018	1032		43	36		65,1	65,5		62,4	63,3		4,1	3,4	
MACROREGION 4	1988	1989		1863	1867		125	122		63,7	63,8		59,5	59,7		6,3	6,1	
S-W Oltenia	1103	1112		1028	1040		75	72		64,1	64,6		59,3	60,0		6,8	6,5	
W	885	877		835	827		50	50		63,2	62,9		59.6	59,3		5,6	5,7	
ROMANIA	9994	9944		9353	9369		641	575		63,0	62,9		58,8	59,0		6,4	5,8	

Table 6. ***Financial Allocation on Development Regions and Priority Axes POR (2007 – 2013)***

Priority Axes POR	**Funds allocated on axes (FEDR and co-financing) 2007 - 2013**		**Regions**							
			NE	**SE**	**S**	**SV**	**V**	**NV**	**C**	**B-I**
			% in the total funds allocated							
	Millions Euro	**%**	**16,32**	**13,25**	**14,23**	**14,01**	**10,34**	**12,09**	**10,90**	**8,86**
			Allocated Funds (FEDR and co-financing) - millions Euro -							
1. Supporting the sustainable development of cities	1 391.17	31.73	227.04	184.33	197.96	194.90	143.85	168.19	151.64	123.26
potential growth poles, FEDR	1 117.81		182.43	148.11	159.07	156.60	115.58	135.14	121.84	99.04
2. Improving the regional and local transport infrastructure	876.71	20.00	143.08	116.16	124.76	122.83	90.65	105.99	95.56	77.68
of which FEDR	758.36		123.76	100.48	107.92	106.25	78.41	91.69	82.66	67.19
3. Improving the social infrastructure	657.53	15.00	107.31	87.12	93.56	92.12	67.99	79.50	71.67	58.26
of which FEDR	558.90		91.21	74.06	79.52	78.30	57.80	67.58	60.92	49.51
4. Supporting the development of the local and regional business environment	709.89	16.19	115.86	94.06	101.02	99.45	73.40	85.83	77.38	68.89
of which FEDR	633.42		103.39	83.92	90.13	88.74	65.50	76.58	69.04	56.12
5. Sustainable development and tourism's promotion	616.77	14.07	100.65	81.72	87.77	86.41	63.78	74.57	67.23	54.64
of which FEDR	558.90		91.22	74.05	79.53	78.30	57.79	67.57	60.92	49.52
TOTAL Axes 1-5	**4 252.07**	-	**693.94**	**563.39**	**605.07**	**595.71**	**439.67**	**514.08**	**463.48**	**376.73**
of which FEDR	**3 627.39**		**592.01**	**480.62**	**516.17**	**508.19**	**375.08**	**438.56**	**395.38**	**321.38**
6. Technical assistance	131.51	3,00	The Funds of the Technical Assistance Priority Axis are not regionally allocated							
of which FEDR	98.63									
TOTAL POR (Axes 1-6)	**4 383.58**	**100.00**								
of which FEDR	**3 726.02**									

Source: POR 2007 – 2013. Annual Implementation Report 2008, Romanian Government, MDRL, June 2009, p. 14.

At regional level, the sectoral operational programs (POS) are also developed, the National Program for Rural Development (PNDR), complementary to the priority axes of POR. The development of a regional employment multiplier based on the impact of POR and POS starts from the development capacity of jobs in the economic sectors: manufacturing industry (T), agriculture (A), market services (N), governmental services (G), using the total working labour equation on a regional level:

$$L_R = L_i + \sum_{j=1}^{4} L_j + L_k + L_z \qquad (10)$$

L_R = employment in the region

L_i = employment in the activities developed through the POR project

$\sum_{j=1}^{4} L_j$ = employment in the activities (jobs created) through the POS projects (4 projects: transport, environment, human resource development, competitiveness)

L_k = employment in the activities (jobs created) through the PNDR project (1 project for rural development)

L_z = employment in the region's economy

We assume that the activities and the infrastructure of the region's economy serve all the economic interventions of the POR, POS and PNDR programs, and this relation can be expressed as follows:

$$L_z = \alpha(L_i + \sum_{j=1}^{4} L_j + L_k) \qquad (11)$$

Where α is a positive constant specific to each program that signifies the cumulative effects of all the programs upon the level of employment.

A global analysis at Romania's level shows us that in the context in which until 2020 it is foreseen that there will be 550,000 jobs created, as an effect of the macroeconomic impact of the Community Support Framework 2007 – 2013 for the year 2009, α coefficient will have the value $\alpha_{2009} = 6.19 \times 10^{-3}$.

By substituting (11) into (10), we obtain:

$$L_R = (L_i + \sum_{j=1}^{4} L_j + L_k) + \alpha(L_i + \sum_{j=1}^{4} L_j + L_k) \qquad (12)$$

$$L_R = (1+\alpha)(L_i + \sum_{j=1}^{4} L_j + L_k)$$

By considering the time variation of labour, we obtain:

$$\Delta L_R = (1+\alpha)\Delta(L_i + \sum_{j=1}^{4} L_j + L_k) \quad (13)$$

$$\frac{\Delta L_R}{\Delta(L_i + \sum_{j=1}^{4} L_j + L_k)} = (1+\alpha) \text{ , or, at limit } \frac{dL_R}{d(L_i + \sum_{j=1}^{4} L_j + L_k)} = (1+\alpha)$$

(1+α) is the *cumulative multiplier of employment*, which shows that one supplementary job created due to the activities developed through the POR, POS and PNDR programs will lead to an increase with (1+α) of the total employment in the region.

The HERMIN Model

The HERMIN model is designed for environments under structural change (Barry et al., 2000) and used for estimating the impact of structural and cohesion funds upon the national economies of the EU Member States (table 2), presenting various aspects of these with regards to the absorption and distribution different in terms of destination (the infrastructure's development, human capital's development or directly for economic actions). The HERMIN modelling framework needed to be based on a fairly simple theoretical framework that permitted inter-county and inter-region comparisons.
The HERMIN model (Bradley, Modesto et al., 1995) used in the EU states for estimating the impact of structural and cohesion funds is characterised by the following features:

(1) it is a macroeconomic model with an annual time horizon and multi-sectoral coverage area that includes the following sectors: T sector – manufacturing industry, N sector – market services, A sector – agriculture and G sector – governmental services (Kejak and Vavra, 1998, Barry et al., 2003);
(2) it can describe the functioning and flexibility of labour force in relation to the potential influences of the labour migration to inter-regional;
(3) it is a medium scale model, empirical, entirely written in structural form, based on the conventional Keynesian mechanisms describing the functioning of the demand-product equilibrium for all the sectors;
(4) it ensures the assessment of the economic policies impact upon the individual sectors, emphasizing the sectoral changes;
(5) it is a structural model, based on microeconomic fundaments: the supply includes the main mechanisms incorporations through which the Structural and Cohesion Funds influence the productive potential, the direct externalities (upon the output) and indirect (upon the production factors – capital and labour) (Bradley and Morgenroth, 2004). The model functions as an integrated system of equations with inter-relations between all the sub-components.

The HERMIN model structure (figure 1), where many branches and economic operators can be found, emphasizes the variations of the capital accumulation, of the technological progress, the relations between the stocks and flows and the retrospective expectations, is built on three blocks: a supply block, an absorption block and an income distribution block (Bradley, Untiedt, Timo, 2007; Bradley, Petrakos, Traistaru, 2004).

Figure 1. **The HERMIN Model Schema**

Supply aspects

Manufacturing Sector (mainly tradable goods)

Output = f_1(World Demand, Domestic Demand, Competitiveness, t)
Employment = f_2(Output, Relative Factor Price Ratio, t)
Investment = f_3(Output, Relative Factor Price Ratio, t)
Capital Stock = Investment+(1-δ)Capital Stock$_{t-1}$
*Output Price = f_4(World Price*Exchange Rate, Unit Labour Costs)*
Wage Rate = f_5(Output Price, Tax Wedge, Unemployment, Productivity)
Competitiveness = National/World Output Prices

Building and Construction Sector (mainly non-tradable)

Output = f_6(Total Investment in Construction)
Employment = f_7(Output, Relative Factor Price Ratio, t)
Investment = f_8(Output, Relative Factor Price Ratio, t)
Capital Stock = Investment+(1-δ)Capital Stock$_{t-1}$
Output Price = Mark-Up On Unit Labour Costs)
Wage Inflation = Manufacturing Sector Wage Inflation

Market Service Sector (mainly non-tradable)

Output = f_6(Domestic Demand, World Demand)
Employment = f_7(Output, Relative Factor Price Ratio, t)
Investment = f_8(Output, Relative Factor Price Ratio, t)
Capital Stock = Investment+(1-δ)Capital Stock$_{t-1}$
Output Price = Mark-Up On Unit Labour Costs)
Wage Inflation = Manufacturing Sector Wage Inflation

Agriculture and Non-Market Services: mainly exogenous and/or instrumental

Demographics and labour Supply

Population Growth = f_9(Natural Growth, Migration)
Labour Force = f_{10}(Population, Labour Force Participation Rate)
Unemployment = Labour Force – Total Employment
Migration = f_{11}(Relative expected wage)

Demand (absorption) aspect

Consumption = f_{12}(Personal Disposable Income)
Domestic Demand = Private and Public Consumption + Investment + Stock changes
Net Trade Surplus = Total Output – Domestic Demand

Income distribution aspects

Expenditure prices = f_{13}(Output prices, Import prices, Indirect tax rates)
Income = Total Output
Personal Disposable Income = Income + Transfers – Direct Taxes
Current Account = Net Trade Surplus + Net Factor Income From Abroad
*Public Sector Borrowing = Public Expenditure – Tax Rate * Tax Base*
Public Sector Debt = (1 + Interest Rate) Debt$_{t-1}$ + Public Sector Borrowing

Key Exogenous Variables
External: World output and prices; exchange rates; interest rates;
Domestic: Public expenditure; tax rates.

Source: Bradley, J. et al. 2007, p. 50, figure 1.1.

In order to be able to estimate the effect of the structural instruments, which include a complex system of measures, their aggregation must take place in categories with economic significance represented by three types of expenditures regarding:

1) physical infrastructure – PI;
2) human resource – HR;
3) direct aid to the productive sector (market services and agriculture) – APS, and the possible co-financing sources together with the national one must also be distinguished.

By applying the HERMIN model to the European states with regard to measuring the impact of the cohesion policy, Bradley et al. (2007) classifies the countries into three groups, based on the size of the cumulative multipliers:

1) High cumulative multipliers: Ireland (4.82); Romania (4.60); Czech Republic (4.38);
2) Medium cumulative multipliers: Estonia (3.65); Lithuania (3.36); Latvia (2.78); Slovakia (2.62); Greece (2.47); Poland (2.39); Hungary (2.37); Spain (2.40); Cyprus (2.21);
3) Low cumulative multipliers: Bulgaria (1.87); Slovenia (1.86); Portugal (1.84).

In Romania, the HERMIN model was implemented for the first time during 1997-1999 (Ciupagea, 2000), and a second version of the HEROM model is currently in use (Ţurlea, 2006), which is based on the specification of the standard HERMIN model (Bradley, Modesto et al., 1995). The model advances more than 240 equations formed by identities or pre-established functional relations between economic variables, being adapted to the specificities of the Romanian economy and answering the needs of the ex-ante studies of the impact of structural funds developed by the European Commission.

The simulation is done for two scenarios that are based on the Standard HERMIN model for the 2007-2020 period, with the following hypotheses:
Hypothesis 1 (H1) – the structural funds are present with the material contributions which exists in the National Development Plan (PND).
Hypothesis 2 (H2) – the contributions for the structural funds are not present in the PND after, thus maintaining the ceiling to the level of the pre-adherence funds corresponding to 2006, considering an absorption rate of 100%.
The results of the simulations on the indicators regarding the labour market (table 7) emphasizes differences between the two scenarios.

The modelling of labour market was accomplished through the analysis of the wage policies and regulations on the labour market (taxation), of the two indicators - employment rate and labour participation rate. The mechanism establishing the wages on the labour market take into account the labour cost and world prices (Charemza and Turlea, 1998).
The total employment in the four economic sectors T, N, A, G is equivalent to the labour demand used for estimating unemployment.

Table 7. ***The macroeconomic impact of Structural Funds. The percentage difference between the values obtained in H1 and H2 (%)***

Year / Indicator	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Employment (L)	1.93	1.75	2.57	3.39	4.01	4.60	7.46	7.04	6.98	7.38	7.61	7.68	8.40	9.74
Employment in N sector	0.66	1.31	1.94	2.54	3.12	3.66	4.57	4.50	4.45	4.40	4.40	4.34	4.28	4.21
Employment in T sector	7.70	5.82	8.54	11.23	13.09	14.29	25.87	23.96	23.75	26.20	27.33	26.73	30.09	36.27
Unemployment rate (UR)	-23.42	-27.87	-42.59	-46.43	-47.48	-50.27	-59.08	-47.59	-45.68	-43.90	-42.24	-44.78	-47.27	-3.95

Source: PND 2007-2013, p. 371

The total employment in the four sectors of the economy on the country's level is equivalent to the labour force demand, as it is also of reference for estimating unemployment. The labour market will be significantly influenced by funds so that in the 14 years of the prognosis period over 550,000 jobs will be created in H1. The annual growth rates in H2 are -0.25%, while in H1 have positive values 0.42% annually. These lead to a net difference of employment (L) in 2020 to almost 10% against H2. The unemployment rate (UR) in 2020 will be in H1 almost half of its level corresponding to H2. The increase of the labour demand in H1 will be larger in the tradable goods sector, where in 2013 the number of jobs will go up by 23% while in agriculture a fall will be registered, according to the two scenarios.

The INPUT-OUTPUT Model on Labour Market on the Development Regions' Level

Another method used for studying the impact is the input-output model designed for local development (Matei, 2007; Matei et al., 2009; McNicoll and Baird, 1980), for inter-regional economic development (Cardenãso and Oosterhaven, 2010) or for the effects of the European funds in Romania's regions (Bonfiglio, 2005).

The analyses determine the effects of the appearance or expansion of some activities in the economic process specific to local development, more precisely establishing the impact of a new activity upon the economic and social local development.

In theory, the input-output model (I - O) is design with a simple, functional structure of the economy, incorporating the links between the flows of intermediary goods, the fact that the "inputs are themselves current outputs for the other processes of the system" (Lancaster, 1973) being of essence. The I – O multiregional model (described by Bonfiglio, 2005) for the 8 development regions (with a NUTS development level, table 4) of Romania can be described as a model of interactions and transactions between the economic sectors and between regions, as follows:

$$\begin{vmatrix} x^1 \\ x^2 \\ x^3 \\ x^4 \\ x^5 \\ x^6 \\ x^7 \\ x^8 \end{vmatrix} = \begin{vmatrix} \underline{A^{11}} & A^{12} & A^{13} & A^{14} & A^{15} & A^{16} & A^{17} & A^{18} \\ A^{21} & \underline{A^{22}} & A^{23} & A^{24} & A^{25} & A^{26} & A^{27} & A^{28} \\ A^{31} & A^{32} & \underline{A^{33}} & A^{34} & A^{35} & A^{36} & A^{37} & A^{38} \\ A^{41} & A^{42} & A^{43} & \underline{A^{44}} & A^{45} & A^{46} & A^{47} & A^{48} \\ A^{51} & A^{52} & A^{53} & A^{54} & \underline{A^{55}} & A^{56} & A^{57} & A^{58} \\ A^{61} & A^{62} & A^{63} & A^{64} & A^{65} & \underline{A^{66}} & A^{67} & A^{68} \\ A^{71} & A^{72} & A^{73} & A^{74} & A^{75} & A^{76} & \underline{A^{77}} & A^{78} \\ A^{81} & A^{82} & A^{83} & A^{84} & A^{85} & A^{86} & A^{87} & \underline{A^{88}} \end{vmatrix} \times \begin{vmatrix} x^1 \\ x^2 \\ x^3 \\ x^4 \\ x^5 \\ x^6 \\ x^7 \\ x^8 \end{vmatrix} + \begin{vmatrix} fd^1 \\ fd^2 \\ fd^3 \\ fd^4 \\ fd^4 \\ fd^5 \\ fd^6 \\ fd^7 \\ fd^8 \end{vmatrix} \qquad (14)$$

Where,
X is the output column vector
A is the coefficient's matrix
F_d is the vector of the final demand
A^{12}, A^{21}, … refer to the flows between sectors and regions.
A^{11}, A^{22} … A^{88} refer to the flows of goods and services on unit of output, and to the trade inside the region

The multiregional model of I – O can be written in the form of the equation:

$$X = AX + f_d \tag{15}$$
$$X = (1 - A)^{-1} \cdot f_d$$

The relation for determining the impact (Matei et al., 2009) is

$$\Delta x = \left[1 - \overline{A}\right]^{-1} \Delta F, \tag{16}$$

Where

Δx is the modification in the local outputs derived from the operations specific to the new local activities. Δx will be a column vector with n+1 elements.

$\overline{A}$ is the extended I – O matrix of the intermediary flows' coefficients, which includes a line and a column correspondent to the local activities.

ΔF represents the changes in the final demand determined by the creation of a new local activity.

In terms of determining, from equation (16) of the outputs correspondent to the n+1 local activities, as well as to knowing the coefficients of the employees' need, for each output unity e_i, i=1, n+1, the impact of the new local activity upon the labour force need can be determined.

$$\Delta E_i = e_i \Delta x_i, i = 1, \overline{n-1} \tag{17}$$

Where ΔE_i measures the changes in employment from the i activity and Δx_i is the i^{th} element of the column vector x.

In the I – O model, replacing the flows of goods and services with those of labour and income has been the fundament of developing a study by Bonfiglio (2005), regarding the effects of using the European funds upon the regional development in Romania. The author has developed an I – O multi-regional model for Romania, assessing the effects upon the labour market and income as a result of the development policies promoted under the European funds for the 2007-2009 period, analysing the inter-relations from and between (the economic branches) the development regions. The author's conclusions state the fact that the structural funds in general have a positive effect upon the degree of development and reducing the economic disparities, taking into consideration the

economic sectors (agriculture, industry, services) and social (labour market and income) between regions (table 8).
Referring to the creation of new jobs, the distribution of half of the jobs is assigned between industry 29% and services 21%, the other half being in the agriculture, and the income are at a level of 5.3% in agriculture, 44.7% in industry and 50% in services. In terms of effectiveness, policy generates an increase in income by 32% of public expenditure and in employment by 183 labour units for each one million Euro. At a sector level, policy demonstrates to be more effective in services, as for income, and in agriculture, as for employment.

***Table 8*. The impact of structural funds upon employment during 2007 – 2009 in Romania**

	NE	**SE**	**S**	**SW**	**W**	**NW**	**C**	**B If**	**RO**
Agriculture	55.7	46.5	63.8	52.1	38.6	48.6	36.4	7.5	49.6
Industry	24.2	27.3	22.8	28.5	35.0	29.6	41.9	45.4	29.1
Services	20.1	26.2	13.4	19.4	26.4	21,8	21.7	47.0	21.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Bonfiglio (2005, p.26, table 10)

Conclusions

The assessment of the possible effects that the community structural instruments of EU can produce at the economic level in the development regions of Romania can be accomplished through the use of certain economical-mathematical modelling designed for simulating the national macroeconomic system in the multi-sectoral and multi-institutional variants.
Characterised by the sets' triplet (inputs I, system's status S and outputs O), the regional model is a multitude of parts interacting with one another, described as follows:

$$S = \{T, I, F, S, O, \varphi, .\gamma\}$$

Where,
T – is the time for ordering events (as the system has a continuous time);
I – inputs' set;
F – the set of the segment input system;
E – outputs' set;
S – the set of the system's states (that we declare it to be the modelling concept of the internal structure of the system, which contains its "history" and which affects its present and future and together with the inputs' form determine in an unique manner the system's outputs);
φ – is the function of response of the system
$\varphi = I * S \to O$

That we use in our case, of the community structural instruments in the region, in the sense that: at a certain input I and a certain status of the system S can reach a certain response O.

γ - is the function of the states' transition.

The rule of the system's equilibrium, the behavioural equations and the macroeconomic identities have used annual data bases, appealing to Keynesian mechanism for describing the way of functioning of the demand-supply equilibrium for all the economic sectors.
The presented HERMIN model, the HEROM model, the cumulative multiplier of employment based on the community structural instruments and the multi-regional I – O model are testing different scenarios for European financial instruments allocation on a national economic structure, financial source, distributed on the level of the development regions on a 2007 – 2020 prognosis time horizon (2007 – 2013 – European financing and 2014 – 2020 the post-transfer period), a period when employment changes will take place.
The experimented models (HERMIN, HERMON, I - O) or the cumulative regional employment multiplier justify the economic and social policy decision and allow the effects' quantification (credible) if we compare with what has been registered for the 2007 – 2008 period, a period that for Romania represents the first, respectively the second year when the country's statute is that of EU Member, with rights to access the structural and cohesion funds.

The I – O links on a regional level generate feed-back effects, both direct (the increase of the number of jobs and of the employees' income as a result of the insertion of the structural instruments) and indirect (the increase of demand in the sectors supporting the new activities developed as a result of the European financial instruments, thus increasing the output, employment and income in these sectors) and induced (the employees from the new activities created through the European financial intervention spend a part of their income for buying goods and services on a local level, thus increasing the demand in that sector).

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